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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,556	02/04/2002	Ravi Narasimhan	MP0091	4335
28285	7590	10/21/2005	EXAMINER	
KATTEN MUCHIN ROSENMAN LLP (MARVELL) IP DOCKET 1025 THOMAS JEFFERSON STREET, N.W. SUITE 700, EAST LOBBY WASHINGTON, DC 20007-5201			MEEK, JACOB M	
			ART UNIT	PAPER NUMBER
			2637	

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/067,556	NARASIMHAN, RAVI
	Examiner Jacob Meek	Art Unit 2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 04 February 2002.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1 - 119 is/are pending in the application.
- 4a) Of the above claim(s) 29 - 37, 55, 56, 60-67, 85, 86, 90-97, 115, 116 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) See Continuation Sheet is/are rejected.
- 7) Claim(s) See Continuation Sheet is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 04 February 2002 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____.   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/02, 2/05</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____.                                   |

Continuation of Disposition of Claims: Claims rejected are 1 - 6, 11, 13 - 16, 26, 28, 38 - 43, 45, 47 - 49, 52 - 54, 57, 68- 73, 77 - 79, 82 - 84, 87, 98 - 103, 107 - 109, 112 - 114, and 117.

Continuation of Disposition of Claims: Claims objected to are 7 - 10, 12, 17 - 25, 27, 44, 46, 50, 51, 58, 59, 74 - 76, 80, 81, 88, 89, 104 - 106, 110, 111, 118, and 119.

## DETAILED ACTION

### ***Election/Restrictions***

1. Applicant's election without traverse of claims 1 – 28, 38 – 54, 57 – 59, 68 – 84, 87 – 89, 98 – 114, and 117 - 119 in the reply filed on 7/22/05 is acknowledged.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claim 57 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 57 is a method claim that generates a calculated value, but does not utilize the calculated value for any purpose.

See MPEP 2106, IV.B.1. "In practical terms, claims define nonstatutory processes if they: – consist solely of mathematical operations without some claimed practical application (i.e., executing a "mathematical algorithm"); or"

### ***Claim Objections***

3. Applicant is advised that should claim 42 and 43 be found allowable, claim 47 and 48 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 – 6, 11, 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Mizoguchi et al (US-6,658,063).

With regard to claim 1, Mizoguchi discloses a method for estimating carrier frequency offset in an OFDM receiver of a WLAN (see column 1, lines 25 – 33), comprising: receiving a preamble including a plurality of short training symbols (see column 1, lines 57 – 60), sampling short training symbols of preamble at a 1<sup>st</sup> rate (see column 5, lines 4 – 34); and correlating at least 2 adjacent short training symbols to generate a correlation signal (see column 6, lines 25 – 34).

With regard to claims 2 and 3, Mizoguchi discloses a method further comprising normalizing correlation signal to generate a normalized correlation signal and dividing correlation signal by energy of at least one adjacent short training symbols (see figure 1, 3 and column 10, lines 32 – 39).

With regard to claim 4, Mizoguchi discloses repeating sampling, correlating and normalizing steps for all of short training symbols (see figure 4, and column 5, lines 4 – 34);

and identifying a maximum value of said normalized correlation signal during short training symbols (see column 8, line 61 – column 9, line 30 where this is interpreted as equivalent).

With regard to claim 5, Mizoguchi discloses multiplying maximum value of correlation signal by a threshold value to identify left and right edges of a plateau defined by normalized correlation signal (see column 9, lines 6 – 16 and figure 4(d) where this is interpreted as equivalent).

With regard to claim 6, Mizoguchi discloses threshold value is greater than 0 and less than 1 (see column 9, lines 18 – 21).

With regard to claim 11, Mizoguchi discloses a software method (see column 1, lines 13 – 18 where FFT and IFFT are known to be SW based techniques).

With regard to claim 13, Mizoguchi discloses preamble forms part of an OFDM packet (see abstract).

5. Claims 14 – 16, 26, 28, 38 – 40, 42, 43, 47 – 49, 68 – 70, 72, 73, 77 – 79, 98 – 100, 102, 103, and 107 - 109 are rejected under 35 U.S.C. 102(e) as being anticipated by Belotserkovsky et al (US-6,711,221).

With regard to claim 14, Belotserkovsky discloses a method for estimating carrier frequency offset in an OFDM receiver of a WLAN (see abstract), comprising: receiving a preamble including a plurality of short training symbols (column 4, lines 16 - 34), sampling short training symbols of preamble using a sampling window (see column 5, lines 17 – 23 where this is interpreted as equivalent); and correlating a 1<sup>st</sup> half of sampling window with a 2<sup>nd</sup> half of sampling window to generate a correlation signal (see column 2, lines 12 – 19).

With regard to claim 15, Belotserkovsky discloses a method where sampling window has a period equal to a duration of two short training symbols (see column 5, lines 6 – 16 where this is interpreted as inclusive).

With regard to claim 16, Belotserkovsky discloses a method of normalizing correlation signal to generate a normalized correlation signal (see column 5, lines 24 – 35 where this is interpreted as a normalizing function).

With regard to claim 26, Belotserkovsky discloses a software method (see column 3, lines 33 – 48).

With regard to claim 28, Belotserkovsky discloses preamble forms part of an OFDM packet (see column 4, lines 16 - 28).

With regard to claim 38, Belotserkovsky discloses a method for estimating carrier frequency offset in an OFDM receiver of a WLAN (see abstract), comprising: sampling short training symbols of preamble using a sampling window (see column 5, lines 17 – 23 where this is interpreted as equivalent); and quantitizing sign bits of real and imaginary components of received signal (see column 3, lines 14 – 31).

With regard to claim 39, Belotserkovsky discloses a method for correlating quantitized sign bits of at least two adjacent short training symbols to generate a correlation signal (see column 4, line 63 – column 5, line 6 where this is interpreted as equivalent).

With regard to claim 40, Belotserkovsky discloses a method for generating a filtered sum of an absolute value of a real component of correlation signal and an absolute value of an imaginary component of correlation signal (see column 5, lines 24 – 35 where computation process is interpreted as providing filtering function).

With regard to claims 42 and 47, Belotserkovsky discloses a method of identifying a local maximum value of filtered sum during short training symbols (see column 5, lines 36 – 42 where computation process is interpreted as providing filtering function).

With regard to claims 43 and 48, Belotserkovsky discloses a method wherein local maximum value is identified by updating and storing filtered sums and by comparing at least one filtered sum to a prior filtered sum and subsequent filtered sum (see column 5, lines 36 – 42).

With regard to claim 45, Belotserkovsky discloses a software method (see column 3, lines 33 – 48).

With regard to claim 49, Belotserkovsky discloses a identifying a time index value corresponding to maximum value; and identifying a correlation signal value corresponding to time index value (see column 6, lines 1 – 8).

With regard to claims 68 – 70, 72, 73, 77 - 79 Belotserkovsky discloses an apparatus implementing the method of claims 38 – 40, 42, 43, 47 – 49, respectively and therefore would be obvious given the aforementioned rejection of claims 38 – 40, 42, 43, 47 – 49.

With regard to claims 98 – 100, 102, 103, 107 - 109 Belotserkovsky discloses an apparatus implementing the method of claims 38 – 40, 42, 43, 47 – 49, respectively and therefore would be obvious given the aforementioned rejection of claims 38 – 40, 42, 43, 47 – 49.

6. Claims 52 –54, 82 – 84, and 112 - 114 are rejected under 35 U.S.C. 102(b) as being anticipated by Schmidl et al (US-5,723,113).

With regard to claim 52, Schmidl discloses a method for estimating carrier frequency offset in an OFDM receiver of a WLAN (see column 1, lines 5 – 12), comprising: receiving a

preamble including a plurality of long training symbols (see column 11, line 60 – column 12, line 4), sampling long training symbols of preamble to generate a received signal (see figure 7 and column 12, line 66 – column 13, line 10); correlating 1<sup>st</sup> and 2<sup>nd</sup> long training symbols to generate a correlation signal (see column 16, lines 36 – 47); and calculating a fine carrier frequency offset from correlation signal (see column 17, lines 41 – 67).

With regard to claim 53, Schmidl discloses a method of calculating comprising: calculating an imaginary component of correlation signal (see equation 24, Im function); calculating a real component of correlation signal (see equation 24, Re function); dividing imaginary component by real component to generate a quotient (see equation 24); calculating an arctangent of quotient to generate said fine carrier offset estimate (see column 23, lines 42 – 64).

With regard to claim 54, Schmidl discloses updating a sampling clock with fine frequency carrier offset estimate (see column 24, lines 11 – 21).

With regard to claims 82 – 84, Schmidl discloses an apparatus implementing the method of claims 52 – 54, respectively and therefore would be obvious given the aforementioned rejection of claims 52 – 54.

With regard to claims 112 – 114, Schmidl discloses an apparatus implementing the method of claims 52 – 54, respectively and therefore would be obvious given the aforementioned rejection of claims 52 – 54.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 57, 87, and 117 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidl et al (US-5,723,113).

With regard to claim 57, Schmidl discloses a method for estimating carrier frequency offset in an OFDM receiver of a WLAN (see column 1, lines 5 – 12), comprising: generating channels estimates for an OFDM subcarrier as a function of subcarrier index values (see figure 8 and column 13, line 66 – column 14, line 10); generating a complex number by summing a product of frequency domain signals (see column 14, lines 5 – 67); and calculating an imaginary component of complex number (see column 14, lines 5 – 67 where this imaginary summation occurs during summation process). Schmidl discloses an equation that is the inverse of applicant's equation (see equation 6). Schmidl discloses that other equations can be used for this calculation. The inversion of Schmidl's equation would be obvious to one of ordinary skill in the art at the time of invention, as it would not materially affect the results of the calculation.

With regard to claim 87, Schmidl discloses an apparatus implementing the method of claim 57, and therefore would be obvious given the aforementioned rejection of claim 57.

With regard to claim 117, Schmidl discloses an apparatus implementing the method of claim 57, and therefore would be obvious given the aforementioned rejection of claim 57.

8. Claims 41, 71, and 101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belotserkovsky et al ('221) in view of Mizoguchi et al ('063).

With regard to claim 41, Belotserkovsky discloses the computation of correlation output, but is silent with respect to details of its implementation. Mizoguchi discloses the details of

correlation output filter (see figure 1, blocks 2, 7), but is silent with respect to details of filter configuration. It would have been obvious to one of ordinary skill in the art at the time of invention to utilize a single pole filter as it is the most basic of filter configurations.

With regard to claim 71, Belotserkovsky in view of Mizoguchi discloses an apparatus implementing the method of claim 41, and therefore would be obvious given the aforementioned rejection of claim 41.

With regard to claim 101, Schmidl discloses an apparatus implementing the method of claim 57, respectively and therefore would be obvious given the aforementioned rejection of claim 57.

#### ***Allowable Subject Matter***

9. Claims 7 – 12, 17 – 27, 44, 46, 50, 51, 58, 59, 74 – 76, 80, 81, 88, 89, 104 – 106, 110, 111, 118, and 119 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Other Cited Prior Art***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kim (US-5,625,573) discloses a technique for fast acquisition of data packets in a related area.

Seki (US-5,694,389) discloses an OFDM system containing a number of aspects of applicant's claimed invention.

Kamerman (US-5,909,462) discloses a system for frequency offset correction in a related field of endeavor.

Kim (US-2002/0126618) discloses an OFDM system for correction of timing and frequency offsets.

Belotskrovsky (US-6,771,591) discloses an OFDM system for the processing of signals.

Gardner (US-6,862,297) discloses an OFDM system for frequency offset estimation.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Meek whose telephone number is (571)272-3013. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571)272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMM  
10/16/05

*J. Meek*

*TG*  
10/20/05  
TEMESGHEN GHEBRETISSA  
PRIMARY EXAMINER